

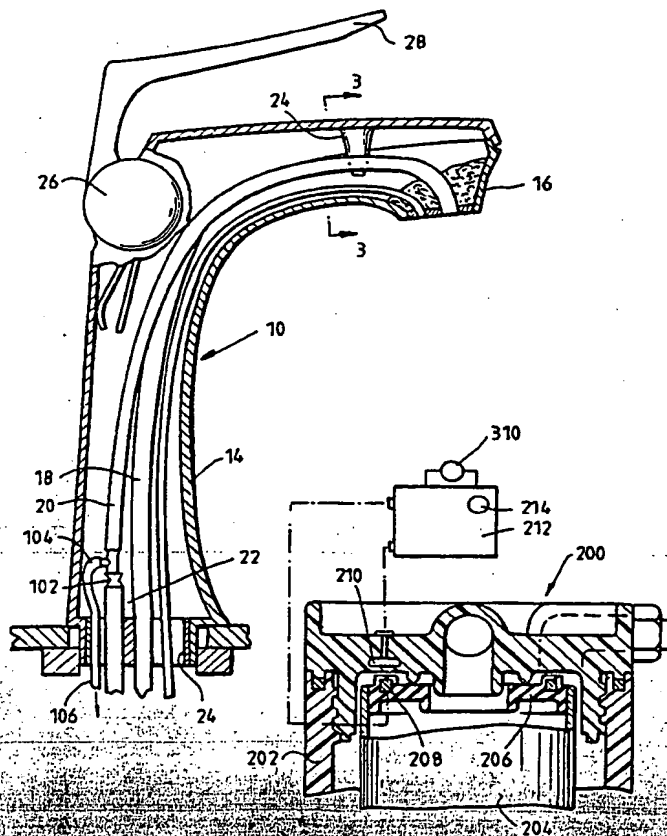


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁵ : F16L 59/16, F16K 27/00, 23/00, B01D 27/10, 35/143, B67D 5/58, F25B 29/00	A1	(11) International Publication Number: WO 94/20784 (43) International Publication Date: 15 September 1994 (15.09.94)
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(54) Title: DISPENSER FOR HOT AND COLD WATER**(57) Abstract**

A dispenser tap (10) dispenses boiling and cold water through a plurality of inlet pipes (18, 20, 21) in a main body (14). Each inlet pipe (18, 20, 21) is thermally isolated from the main body (14) by means of an air gap maintained by an outlet plug (30), an inlet plug (23) and a divider (24) in the main body (14). The tap cold water tube (20) may include a venturi type restriction (102) and bleed tube (104) on the outlet side of the restriction which drains the outlet tube (20) to prevent dripping when the tap is turned off. Water supply for the tap (10) may pass through a filter including a filter detection system (200) with a housing (202) having a switch (210) detecting the presence of a magnet (208) on a screw-in cartridge (204). Also disclosed is a filter exhaustion indication system (300, Figure 5) which is a microprocessor based system indicating when recorded flow times reach a predetermined amount. Also disclosed is a water dispenser (400, figure 6) incorporating the above devices and which includes a refrigeration system and a water heating device (402), in which the condenser coil (414) of the refrigeration system heats the source of water for the heating device (402).



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DISPENSER FOR HOT AND COLD WATER

The present invention relates to a dispenser for dispensing both boiling and chilled water and to various integers that are incorporated in such a dispenser.

5 With respect to dispenser taps for such dispensers a problem occurs with the heating and cooling of pipes and outlets for delivery of the chilled or boiling water. If boiling water is dispensed the pipes and outlet are heated through thermal transfer from the boiling water. Heat is thus lost which reduces the temperature of
10 the dispensed water. Similarly, chilled water will be heated by the pipes and outlet to increase the temperature of the dispensed chilled water. This problem is substantially exacerbated if boiling water is dispensed immediately after chilled water has been dispensed or vice versa. The metallic tap body heats up or cools down depending on
15 the temperature of the water dispensed.

It is an object of the invention to overcome these problems.

In accordance with a preferred aspect of the invention there may be provided a dispenser tap for dispensing a plurality of liquids at different temperatures, said tap including a main body and a
20 liquid outlet, a plurality of liquid inlet pipes coupled to said liquid outlet and said liquid inlet pipes being thermally isolated from said main body.

Preferably said inlet pipes are thermally isolated from one another and are formed of a material of low thermal mass.

25 A problem with taps for dispensing chilled water from displacement type dispensers is that they drip. If ice forms on the evaporating coil of the cooling system a displacement of water will occur because water expands when it freezes. This expansion will force water up the tap and dripping occurs.

is also preferable to replace filters at regular intervals, even if usage has been minimal, as the sediment may contain organic material resulting in bacterial incubation. Known methods to monitor the filter condition include the use of a pressure gauge or switch which measures the differential pressure across the filter. Such methods are not suitable for activated carbon or resin media filters as the filtration properties will be exhausted a long time before the filter is blocked. The measurement of pressure differential will vary depending on the flow rate of the liquid to be filtered. Other methods of measurement involve flow volume measurement using a mechanical counter and rotating vanes. None of these methods allow a time parameter to be considered when determining the exhaustion of the filter.

In order to overcome these problems the invention in yet another preferred aspect may provide a filter exhaustion indication system including a means for indicating flow of a liquid to be filtered through a filter, circuit means including a first timer means for incrementing a counter or memory location dependent on the time said liquid is flowing, a second timer means for incrementing said counter or memory location dependent on predetermined time intervals and means to indicate when a predetermined count for said counter or memory location has been reached.

Preferably said first and second timer means are incorporated in a microprocessor. In a preferred embodiment said microprocessor prevents flow of said liquid to said filter when said predetermined count or a further predetermined count has been reached.

Water chillers for drinking water require an air cooled condenser to be provided which is hot to touch. If a compact unit is needed cooling fans or vents waste space to allow the heat from

the condenser to be dispersed.

It is an object of a further aspect of the invention to provide a water chiller which requires no fans or vents and contact with the condenser is avoided.

5 With this object in view the present invention in another preferred aspect may provide a water chiller unit including a refrigeration system for cooling said water, said refrigeration system including a compressor, evaporator, condenser and expansion valve, whereby said condenser is located in a fluid filled container to cause
10 said fluid to be heated.

 Preferably said fluid is water and provides a preheated source of water for a water heating device. In a preferred embodiment a cooling coil is located co-axially within said condenser to allow additional cooling of said condenser as required by a flow
15 of cooling medium such as water without significant loss of energy stored in the said preheated water.

 These and other objects and aspects of the present invention will be more fully described with reference to the preferred non-limitative embodiments shown in the accompanying drawings,
20 in which:-

 Fig. 1 is a perspective view of a dispenser tap for dispensing hot and cold water;

 Fig. 2 is a cross-sectional view of the dispenser tap of Fig. 1;

25 Fig. 3 is a cross-sectional view along and in the direction of arrows 3-3 of Fig. 2;

 Fig. 4 is a cross-sectional view showing a filter detection system made in accordance with another aspect of the invention;

 Fig. 5 is a filter exhaustion indication system made in

accordance with a further aspect of the invention; and

Fig. 6 is a boiling water/chilled water dispenser made in accordance with a still further aspect of the invention.

5 In Figs. 1 to 3 there is shown a dispenser tap 10 for dispensing both boiling and cold or chilled water. The dispenser tap 10 is adapted to be bench mounted by shoulder 12. Dispenser tap 10 comprises a main body 14 with an outlet head 16. Main body 14 can be formed of brass or any other suitable material. Two inlet tubes 18, 20 carry hot and cold water respectively. An optional tube 10 21 can also be provided, if required. The two tubes 18, 20 are made from a material of low thermal mass, preferably plastics material and are thermally isolated from one another by air gap 22, plug 23 and separator/divider 24. The tubes 18, 20 are also thermally isolated from main body 14. Both tubes 18, 20 lead into valving means 26 15 which are typically ceramic washer valves or control switches for solenoid operation if displacement type dispensers are used. Handles 28 allow manual control of valving means 26. Each tube 18, 20 is coupled to an outlet plug 30. Outlet plug 30 has separate outlets for hot and cold water and can be secured by epoxy 31.

20 The separation of tubes 18, 20 prevents main body 14 from being heated or cooled by the tubes. As main body 14 is not affected by the temperature of tubes 18, 20 the temperature of the dispensed water is not affected by main body 14. Accordingly, chilled water dispensed from tube 20 is not affected by an immediate prior dispensing of hot water from tube 18. In prior art dispenser taps the 25 dispensing of hot water would heat the main body and a subsequent dispensing of chilled water would result in the chilled water being warmed through thermal transfer from the main body.

A problem that can occur is that as water expands as it

freezes water can drip from outlet 16 especially from displacement type dispensers. To overcome this problem a venturi type restriction 102 is located in tube 20. A bleed tube 104 is positioned adjacent and above restriction 102 and discharges into a drain.

5 In use, chilled water flows through tube 20 and issues from outlet 16. During normal water flow no water will enter bleed tube 104. When the flow of water ceases any water displaced by expansion will drip into bleed tube 104 to exit via the drain. It is clear that the non-drip aspect of this embodiment could be
10 incorporated in any tap and is not restricted to its use in the embodiment shown in Figs. 1 to 3.

 To avoid repetition of description similar integers in the various embodiments will be referenced with the same numerals. Fig. 4 shows a filter detection device 200 having a filter housing 202 to which is attached a filter cartridge 204. Cartridge 204 can be held
15 fast by securing filter housing 202 to filter base 203, screwthreaded onto a post or secured in any other suitable manner. Mounted on or within filter gasket 206 is an annular magnet 208. The magnet 208 can be incorporated into the design of the gasket or could be a
20 separate item that is affixed to the filter cartridge 204 or filter gasket 206. A magnetic sensor 210 e.g. a magnetic reed switch, is positioned adjacent magnet 208 for detecting the presence of magnet 208. Sensor 210 is coupled to a circuit 212 for indicating the correct positioning of the filter cartridge 204. A lamp 214 will indicate the
25 correct positioning of the filter cartridge. Magnetic sensor 210 will only be activated when magnet 208 is sufficiently close to sensor 210. This closeness will be predetermined to ensure that the filter cartridge 204 will be clampingly engaged with filter housing 202. If the wrong filter is fitted, e.g. the diameter of magnet 208 is not as

prescribed, or if there is no magnet, then circuit 212 will not activate. The annular nature of magnet 208 allows various degrees of tightness to be applied which will be independent of the rotational position of sensor 210.

5 Although the particular embodiment refers to water filters the invention is also applicable to other filter uses e.g. oil filters in automobiles, hydraulic oil filters and similar situations.

10 Fig. 5 shows a filter exhaustion indication system 300 which incorporates the filter detection device 200 shown in Fig. 4. In this embodiment system 300 is used for water filtration where filter cartridge 204 provides filtered water from outlet 302. Water under mains pressure enters filter cartridge 204 through inlet 304. Circuit 212 is a microprocessor based controller which is coupled to a counter display 306 to indicate the filter exhaustion of filter cartridge 204. Input means 308 e.g. keypad or switches, allow an operator to enter data or access circuit 212. Lamp 214 will be activated by circuit 212 when filter cartridge 204 is exhausted. A switch 310 senses flow of water when the system is operated and may be a flow control switch or manually operated switch. If required a solenoid valve 312 can be inserted in inlet 304 to prevent flow of water when circuit 212 determines that filter cartridge 204 is exhausted.

20 In use, when switch 310 is closed e.g. by coupling to handles 28 or flow of water detected, water flows into filter cartridge 204 from inlet 304 and exits through outlet 302. The microprocessor will increment a memory location or counter 314 at that time. If the flow of water continues beyond a predetermined time interval (e.g. the time to fill a cup with water) the memory location or counter 314 will be incremented as each interval is reached. Accordingly, if a jug is filled there may be, for example, six such increments. As some

filters have their effectiveness shortened by bacterial contamination the counter may also be incremented at a predetermined time interval notwithstanding any dispensing of water. This additional incrementing of the memory location or counter 314 will ensure filter cartridge 204 is replaced periodically, even if not used or, is used infrequently.

When a predetermined count is reached, dependent on type of filter, size, flow rate and other characteristics of the filtering media, lamp 214 will be activated by circuit 212 to indicate that the filter cartridge 204 should be replaced. If required, solenoid valve 312 could be inhibited to prevent any further dispensing of water. When filter cartridge 204 is removed magnet 208 will move away from magnetic reed switch 210 and cause switch 210 to open. The opening of switch 210 will cause circuit 212 to reset memory location or counter 214. When filter cartridge 204 is correctly fitted magnet 208 will again close switch 210 allowing further dispensing of water. The various parameters for the said timers and counters can be changed, if required, by keypad or switches 308. Variation of the parameters may be required, for example for different filter media or different prevailing water conditions.

Fig. 6 illustrates an embodiment of a dispenser 400 which dispenses hot and chilled water. The embodiment uses dispenser tap 10 from Fig. 1 and the filter detection system of Fig. 4. If required the filter exhaustion system can also be incorporated in this embodiment. A displacement type continuous water heater 402, e.g. of the type disclosed in International Patent Application No. PCT/AU93/00038, supplies boiling water to inlet tube 18.

Chilled water is supplied to inlet 20 from a chilled water container 404. Container 404 receives cold water from piping 406 via

5 a solenoid 408. Solenoid 408 will allow cold water to flow when appropriate handle 28 is actuated for dispensing of chilled water. Located inside container 404 is an evaporator coil 410 of a refrigeration system. The refrigeration system includes a compressor 412, a condenser coil 414 located in a preheat container 416 and an expansion valve 417. Valve 417 can be adjustable to suit requirements. A thermostat 418 inside container 404 can be coupled to compressor 412 to allow monitoring of the chilled water temperature and activation of compressor 412.

10 Preheat container 416 receives cold water through piping 420. When appropriate handle 28 is actuated for dispensing of boiling water solenoid 422 will be opened to force cold water into preheat container 416. Water from preheat container 416 will enter continuous water heater 402 through piping 424. Co-axially located
15 within condenser coil 414 is a supplementary cooling coil 426. The supplementary cooling coil 426 is connected to the mains water supply 428 at one end and to a drain 430 at the other end. A solenoid valve 432 is inserted in piping 434 to allow cooling water to flow to drain 430, if required. The supplementary cooling coil 426
20 will be at mains water pressure to eliminate the generation of steam if condenser coil 414 approaches 100°C. A pressure switch 436 senses pressure or temperature in condenser gas pipe 438 and will open solenoid valve 432 to allow cold water to flow when required to reduce the temperature of the condenser coil 414. Under normal
25 conditions heat generated by condenser coil 414 will heat water in preheat container 416 to reduce the energy requirements for water heater 402. This embodiment allows a unit to be supplied which has no fans or exposed heat exchangers.

It will be understood that many modifications may be made

in details of design and/or construction without departing from the ambit of the invention, the nature of which is to be ascertained from the forgoing description and appended claims.

CLAIMS

1. A dispenser tap for dispensing a plurality of liquids at different temperatures, said tap including a main body and a liquid outlet, a plurality of liquid inlet pipes coupled to said liquid outlet and said liquid inlet pipes being thermally isolated from said main body.
2. The dispenser tap as claimed in claim 1, wherein said inlet pipes are thermally isolated from one another and are formed of a material of low thermal mass.
3. The dispenser tap as claimed in any one of claims 1 or 2, wherein said liquid outlet includes an outlet plug to which said inlet pipes are coupled.
4. The dispenser tap as claimed in any one of the preceding claims, wherein a divider is provided adjacent the outlet end of said dispenser tap and an apertured plug is provided at the other end of said dispenser tap to ensure said inlet pipes do not touch each other or said main body.
5. The dispenser tap of any one of the preceding claims wherein said dispenser tap is of the displacement type.
6. A tap including an outlet pipe, said outlet pipe including a restriction and a drain for collecting drips from said outlet pipe located adjacent said restriction on the side of said outlet.
7. The tap as claimed in claim 6, wherein said restriction is a venturi type restriction and said drain is a bleed tube opening into said outlet pipe.
8. The tap as claimed in claim 6 or 7, wherein said tap is of the displacement type for chilled water.
9. A filter detection system including a filter housing for receiving a filter cartridge, a switch sensitive to the correct mounting

of said filter cartridge to said filter housing and means responsive to said switch to indicate that said filter cartridge has been correctly mounted.

5 10. The filter detection system as claimed in claim 9, wherein said switch is a magnetic reed switch and said filter cartridge includes a magnetic body whereby said switch closes when said filter cartridge is correctly mounted.

11. The filter detection system as claimed in claim 10, wherein the magnetic body is annular in shape.

10 12. The filter detection system as claimed in claim 10 or 11, wherein said switch indicates correct mounting of said filter cartridge by distance of said switch from said magnetic body.

15 13. A filter exhaustion indication system including a means for indicating flow of a liquid to be filtered through a filter, circuit means including a first timer means for incrementing a counter or memory location dependent on the time said liquid is flowing, a second timer means for incrementing said counter or memory location dependent on predetermined time intervals and means to indicate when a predetermined count for said counter or memory location has been reached.

20 14. The filter exhaustion indication system as claimed in claim 13, wherein said first and second timer means are incorporated in a microprocessor.

25 15. The filter exhaustion indication system as claimed in claim 14, wherein said microprocessor prevents flow of said liquid to said filter when said predetermined count or a further predetermined count has been reached.

16. The filter exhaustion indication system as claimed in any one of claims 13 to 15, further the filter detection system of any one

of claims 9 to 12, wherein said counter or memory location is reset when said filter cartridge is dismounted from said filter housing.

17. The filter exhaustion indication system as claimed in any one of claims 13 to 16, wherein the predetermined count for said counter or memory location and the predetermined time intervals can be varied by user data input means.

18. A water chiller unit including a refrigeration system for cooling said water, said refrigeration system including a compressor, evaporator, condenser and expansion valve, whereby said condenser is located in a fluid filled container to cause said fluid to be heated.

19. The water chiller unit as claimed in claim 18, wherein said fluid is water and provides a preheated source of water for a water heating device.

20. The water chiller unit as claimed in claim 18 or 19, wherein a cooling coil is located within said condenser to prevent overheating thereof.

21. The water chiller unit as claimed in claim 20, wherein said cooling coil is at mains water pressure and water only flows through said cooling coil to a drain to eliminate the generation of steam if said condenser overheats.

22. The water chiller as claimed in claim 20, wherein said cooling coil is located co-axially within said condenser allowing cooling of said condenser without cooling of said preheated water.

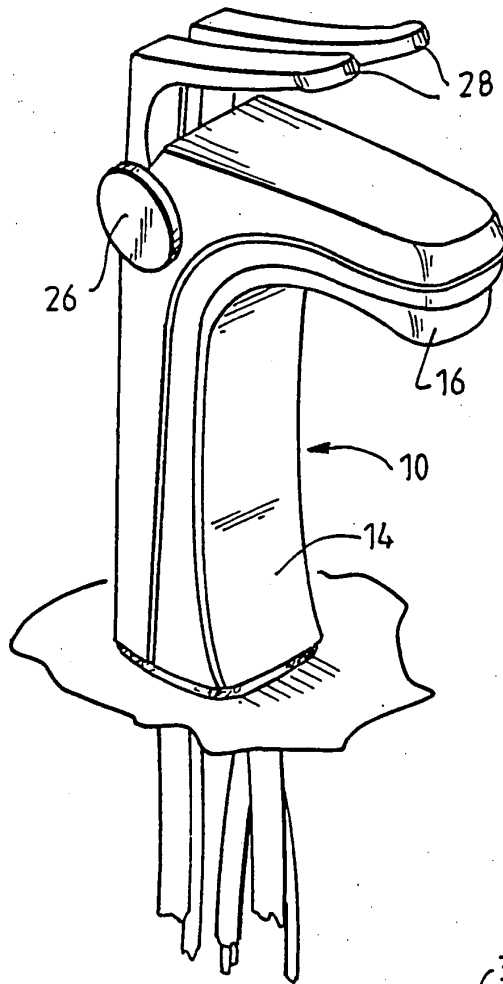


FIG. 1.

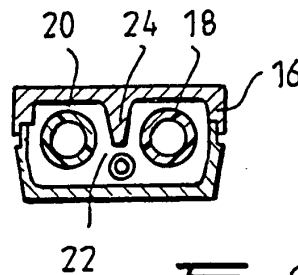


FIG. 3.

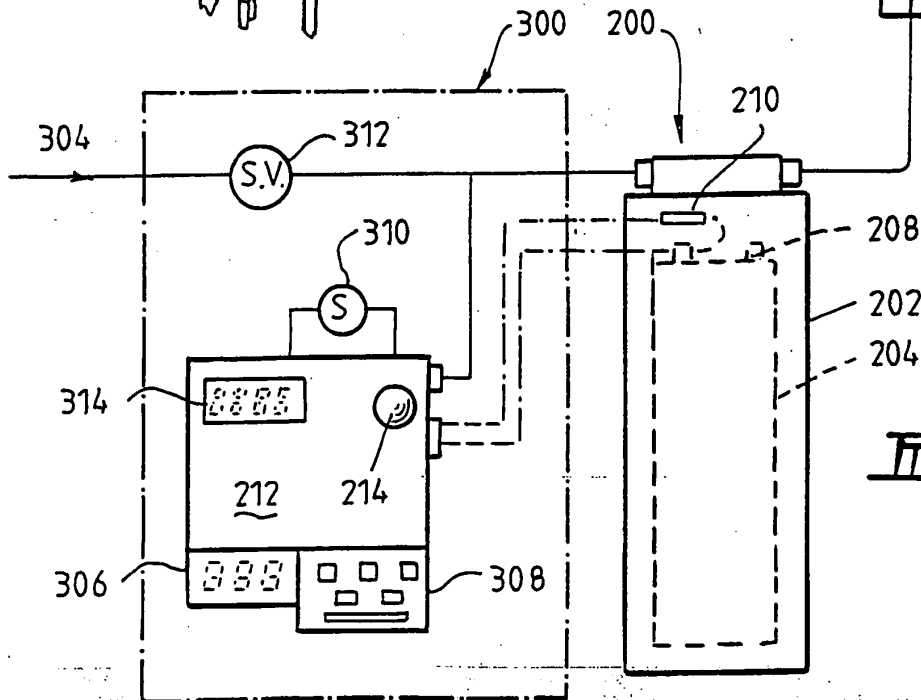
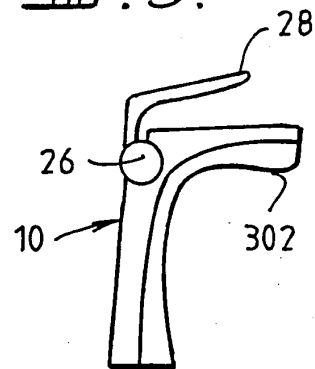


FIG. 5.

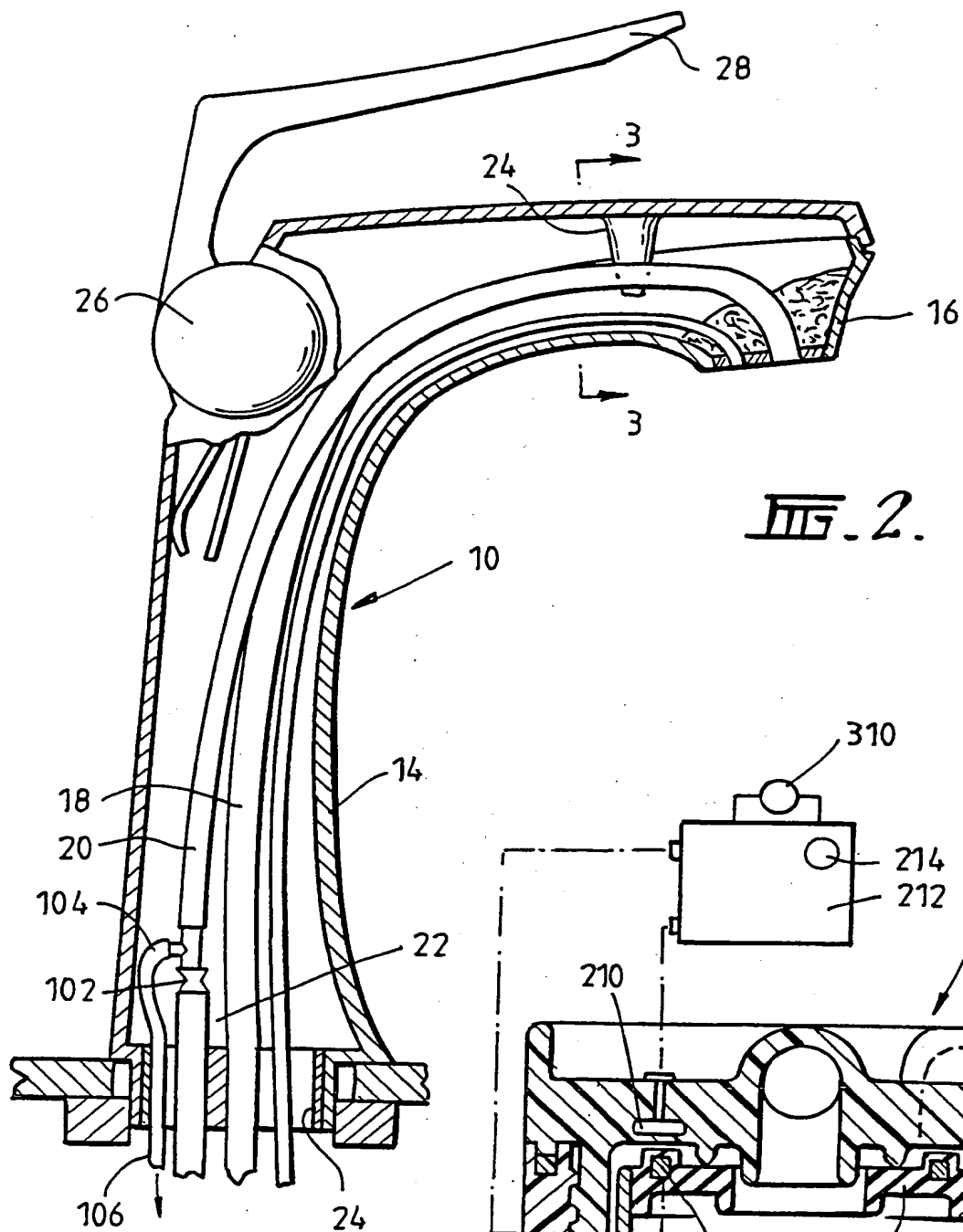


FIG. 2.

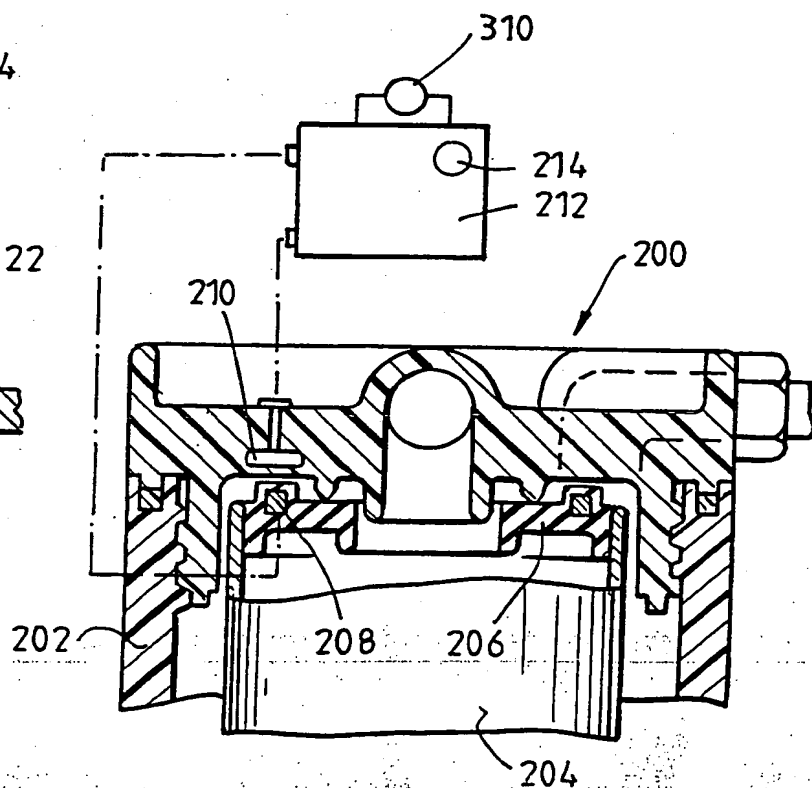
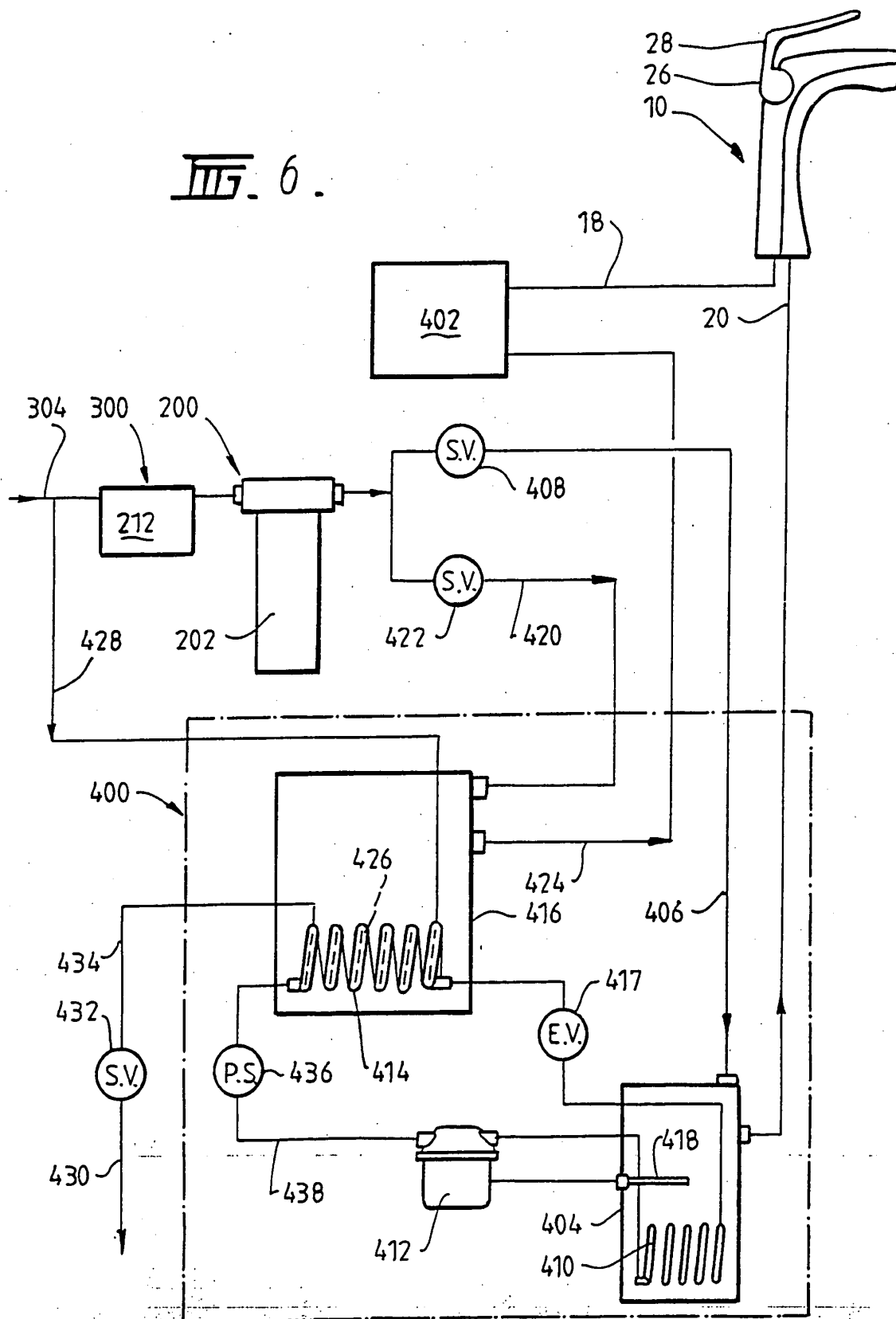


FIG. 4.

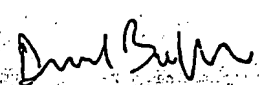
FIG. 6.



INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 94/00095

A. CLASSIFICATION OF SUBJECT MATTER Int. Cl. F16L 59/16, F16K 27/00, 23/00, B01D 27/10, 35/143, B67D 5/58, F25B 29/00 According to International Patent Classification (IPC) or to both national classification and IPC					
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC: F16L 59/16, F16K 49/00, 24/02, 23/00, 27/00, 27/04, B01D 27/10, 35/14, 35/143 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU: IPC as above, B67D 5/58, 5/62 Electronic data base consulted during the international search (name of data base, and where practicable, search terms used) DERWENT: F16K 27/00, 27/04 thermal: insulat: B67D 5/58, 5/62 Derwent only					
C. DOCUMENTS CONSIDERED TO BE RELEVANT					
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.			
A	EP,A, 327974 (HEATRAE SADIA HEATING LTD) 16 August 1989 (16.08.89) figure 1	1-5			
A	CH,A, 105993 (GIRARD) 1 August 1924 (01.08.24) figures 1-3	1-5			
X	AU,A, 8688/27 (ENGINEERS REQUISITES LTD) 27 March 1928 (27.03.28) figures 1-3	6			
<div style="display: flex; justify-content: space-between;"> <div> <input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. </div> <div> <input checked="" type="checkbox"/> See patent family annex. </div> </div>					
<table style="width: 100%; border: none;"> <tr> <td style="width: 33%; vertical-align: top;"> * Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed </td> <td style="width: 33%; vertical-align: top;"> "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family </td> <td style="width: 33%;"></td> </tr> </table>			* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family	
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Date of the actual completion of the international search 29 June 1994 (29.06.94)	Date of mailing of the international search report <u>05 JULY 1994 (05.07.94)</u>				
Name and mailing address of the ISA/AU AUSTRALIAN INDUSTRIAL PROPERTY ORGANISATION PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No. 06 2853929	Authorized officer D. BUTLER  Telephone No. (06) 2832347				

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 94/00095

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate of the relevant passages	Relevant to Claim No.
X	EP,A, 313677 (GEBR SCHMID GmbH & CO) 3 May 1989 (03.05.89) column 4 lines 15-46, figure 3	9-12
X	US,A, 4426284 (MITCHELL et al.) 17 January 1984 (17.01.84) column 3 lines 16-30	9
X	GB,A, 2252514 (PHILIPS ELECTRONICS UK LTD) 12 August 1992 (12.08.92) page 13 line 28, page 14 line 8	9
X	US,A, 3879289 (ASPINWALL et al.) 22 April 1975 (22.04.75) column 2 lines 29-34	9

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Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international search report has not established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

The international application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single inventive concept. In coming to this conclusion the International Authority has found:

(i) Claims 1-5 are directed to a dispenser tap with a plurality of inlets thermally isolated from the tap body. It is considered that the thermal isolation comprises a first "special technical feature".

Continued on Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.: 1-8, 9-12
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No. .

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(continuation)Box II

(ii) Claims 6-8 are directed to a tap including an outlet pipe with a restriction and drain in the outlet pipe for collecting drips. This means of collecting drips is considered to comprise a second "special technical feature".

(iii) Claims 9-12 are directed to a filter detection system with a switch sensing correct mounting of the filter. The sensing is considered to comprise a third "special technical feature".

(iv) Claims 13-17 are directed to a filter exhaustion indication system which monitors the amount of use of a filter. The system of monitoring is considered to comprise a fourth "special technical feature". Claims 16 and 17 also include the special technical feature of claim 9.

(v) Claims 18-22 are directed to a water chiller unit including a condenser located to operate as a heater. The make-up of the unit is considered to comprise a fifth "special technical feature".

Since the above-mentioned groups of claims do not share the technical features identified, a "technical relationship" between the inventions, as defined in PCT rule 13.2, does not exist. Accordingly the international application does not relate to one invention or to a single inventive concept.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/AU 94/00095

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member			
EP	327974	AT JP	76181 2017351	CA US	1302468 4990746	GB	2215018
EP	313677	DE	3776660				
US	4426284						
GB	2252514	BR	9200258	JP	5038491	US	5254242
US	3879289	DE FR IT SE	2432297 2238516 1005981 7408793	AU GB JP	67433/74 1474797 50033560	CA IN JP	1017260 142654 53034022
END OF ANNEX							

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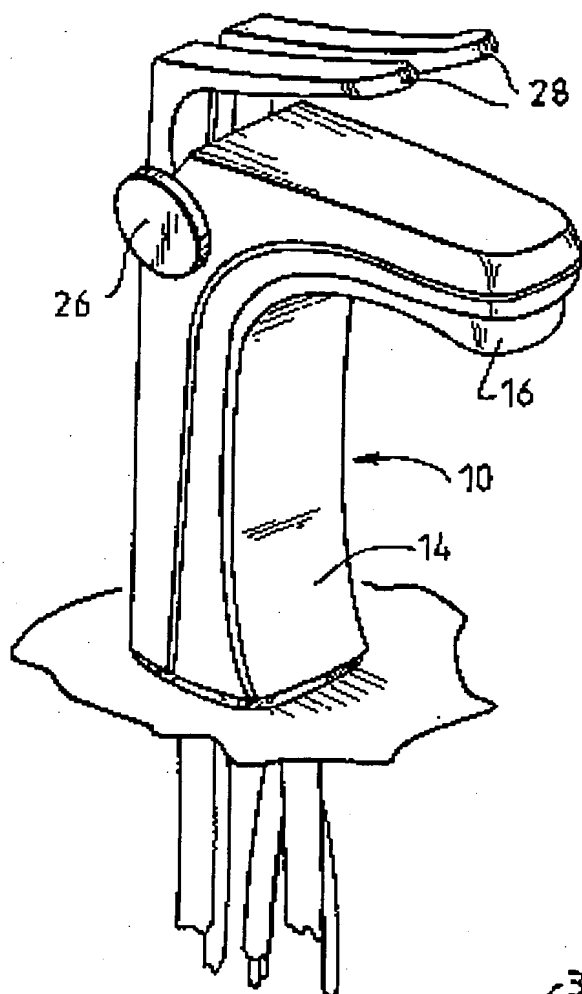


FIG. 1.

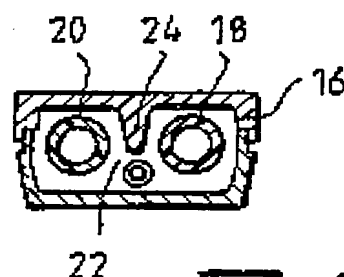


FIG. 3.

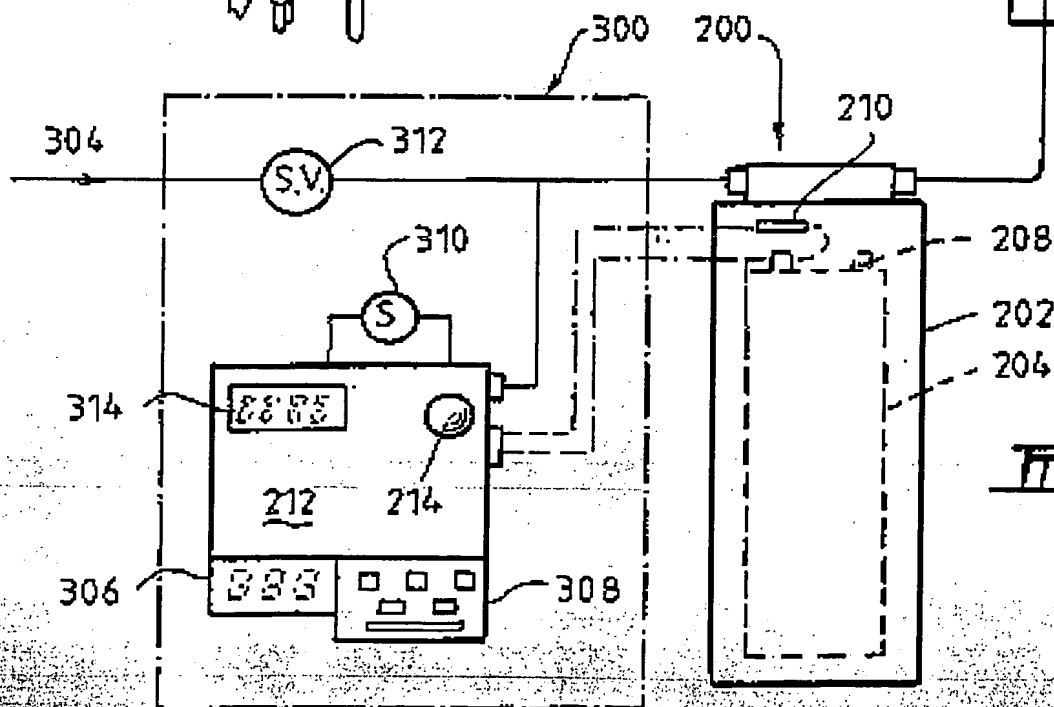
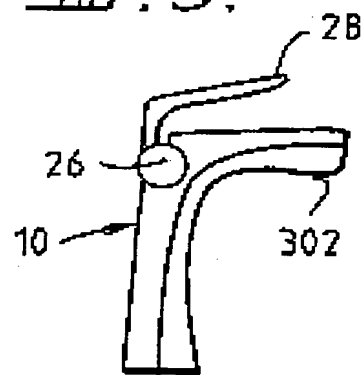


FIG. 5.

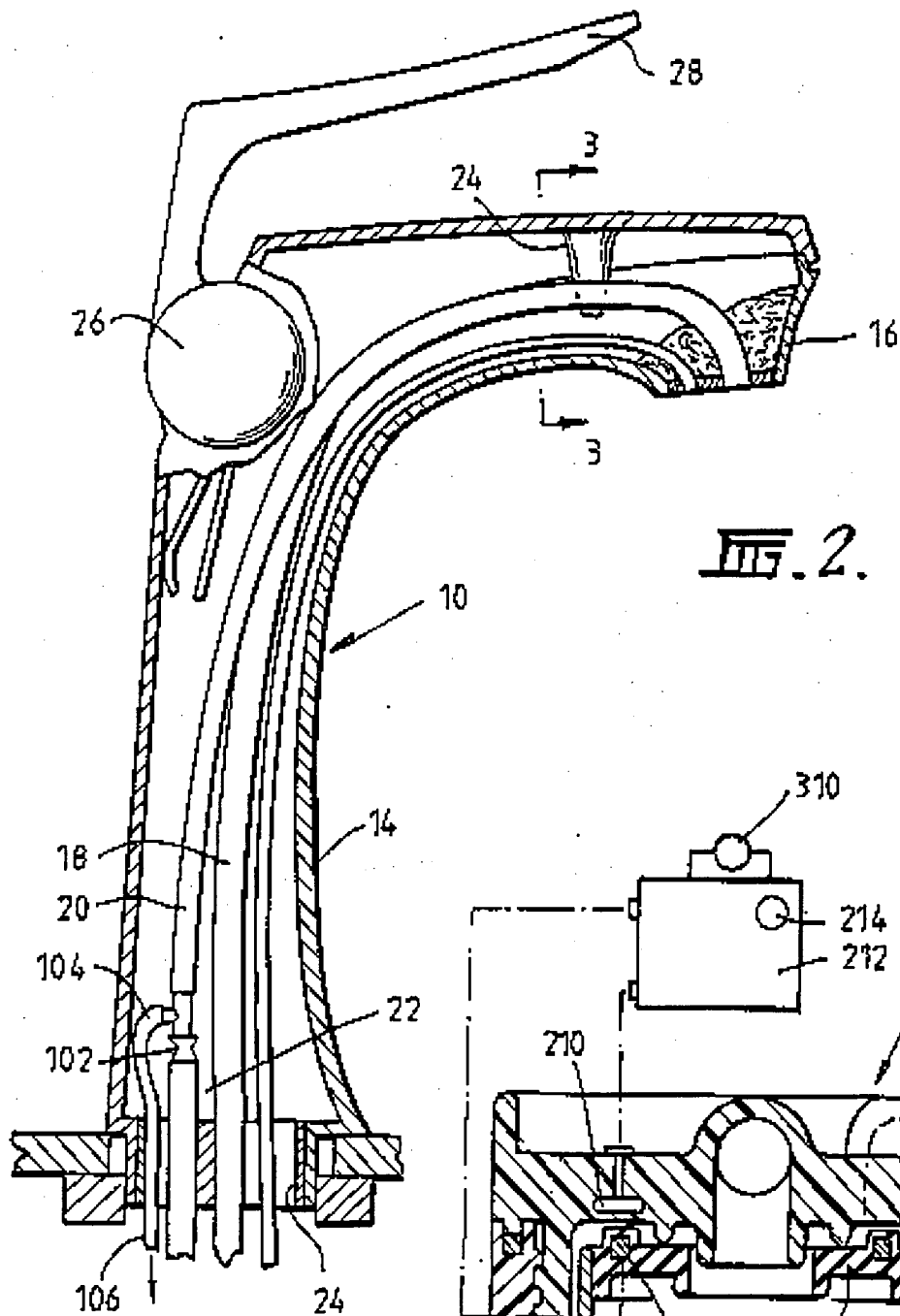


FIG. 2.

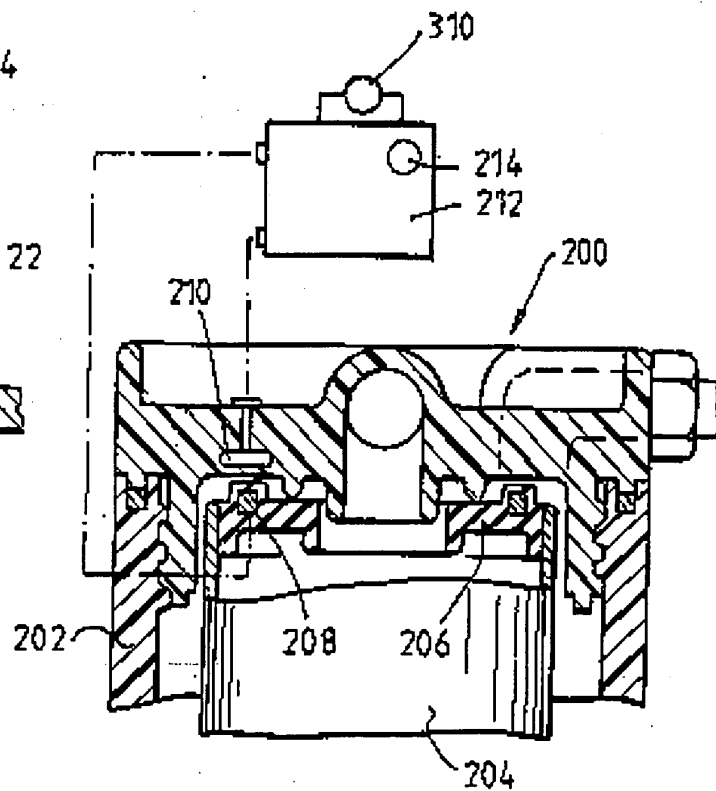
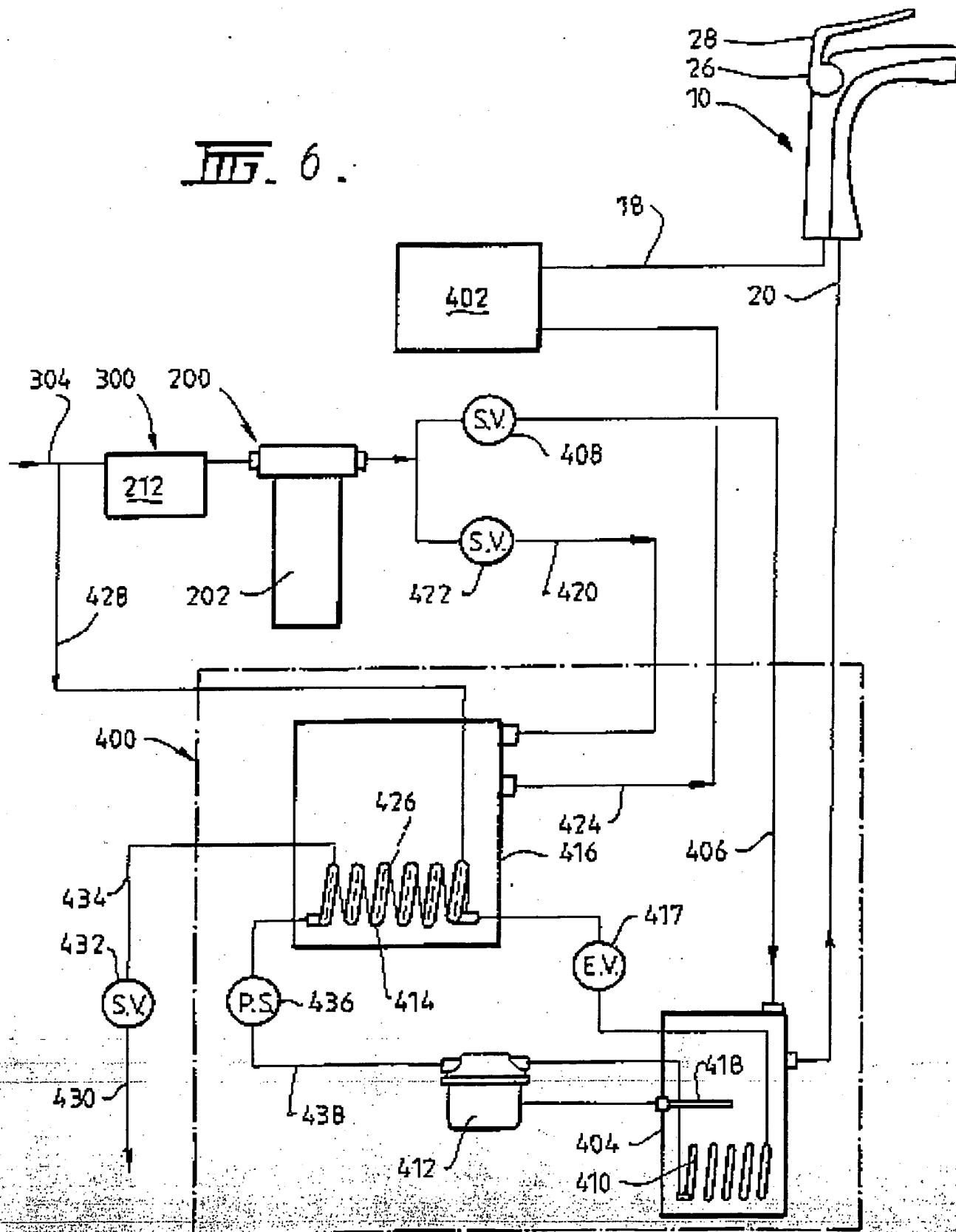


FIG. 4.

FIG. 6.



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